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RADIATIVE CLOSURE STUDIES AT THE NSA ACRF SITE

Delamere, J., Atmospheric and Environmental Research, Inc.
Mlawer, E., Atmospheric & Environmental Research, Inc.
Turner, D., University of Wisconsin-Madison
Clough, S., Atmospheric and Environmental Research
Jensen, M., Miller, M., Johnson, K., Troyan, D., Brookhaven National Laboratory
Shippert, T., Pacific Northwest National Laboratory

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www.bnl.gov

ABSTRACT

This poster will summarize research initiatives aimed at improving our ability to measure and model atmospheric radiation at high latitudes. The North Slope of Alaska ARM Climate Research Facility is an excellent venue from which a simultaneous evaluation of the atmospheric state characterization, radiation instrumentation and spectral line parameters can be made. We will present results from an on-going study of atmospheric water vapor, an important contributor to the radiative flux profile in the Arctic atmosphere. Numerous comparisons between extended-range Atmospheric Emitted Radiance Interferometer (ER-AERI) radiance measurements and line-by-line radiative transfer model calculations have been performed. These comparisons have yielded recommendations for changes to existing water vapor line parameters in the HITRAN database and allowed an examination of the RS-90 radiosonde water vapor profiles. Additionally, we will present results from the Broadband Heating Rate Profile (BBHRP) Project for the NSA site. Among the goals of the BBHRP project, a collaborative effort of all ARM Working Groups, are: a) the evaluation of parameterizations of atmospheric processes and related data sources by intensive radiative flux closure analyses; and b) the generation of a dataset of computed heating rates profiles for use by the Cloud Parameterization and Modeling Working Group for diagnostic purposes and to drive climate models. Results will be presented from a 6-week period in March and April when radiosondes were launched 4 times per day for the Arctic Winter Water Vapor IOP, with a key focus being the evaluation of the quality of the atmospheric state ("Merged Sounding") and cloud field ("Microbase") products.